stereophile

Air Tight ATM-300R power amplifier

Art Dudley | Jan 24, 2019

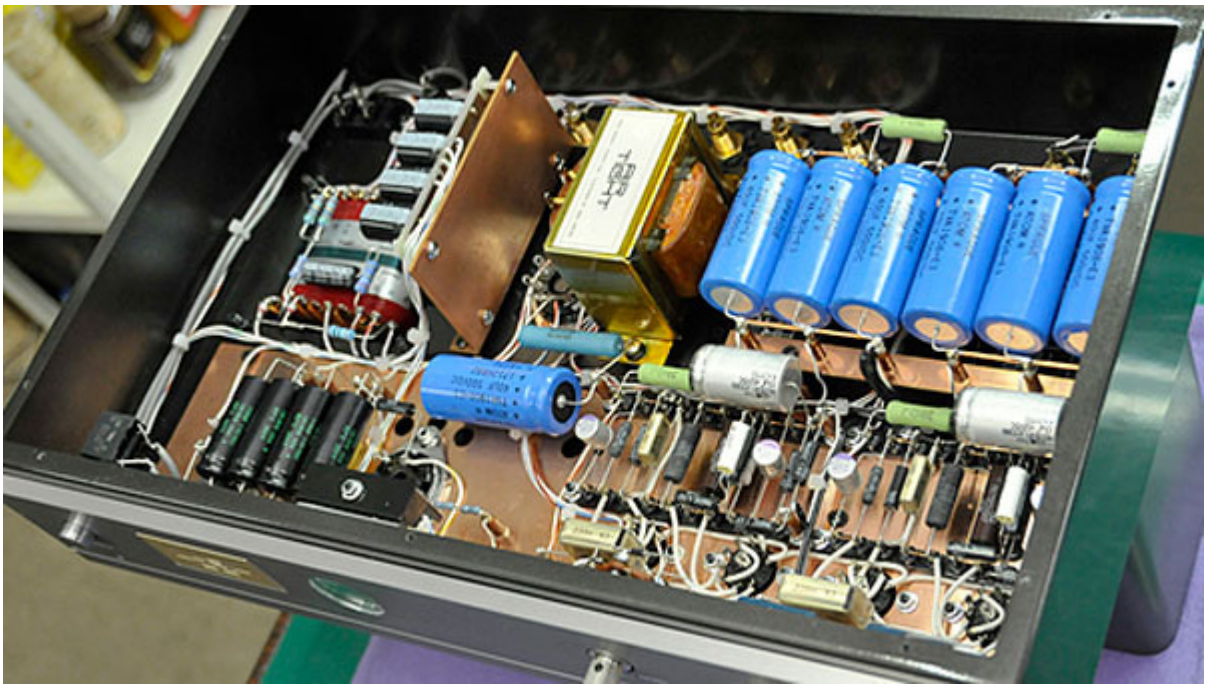
To audio designers in Japan and elsewhere, the single-ended, 300B-tubed amplifier is like a haiku: an art form defined by both its prescribed limitations and the potential such restraint offers for artistic expression. Here, the only hard-and-fast rule is a simple one: output devices are limited to one 300B directly heated triode tube per channel. From there, it's a blank slate: Do you want AC or DC on the output-tube heaters? Tube or solid-state rectification? Low or high gain? Fixed or cathode bias? New parts, vintage parts, or a mix of both? Triode or pentode tubes as drivers? Capacitors or transformers—or nothing at all—between the plates of the driver tubes and the grids of the output tubes?

I suppose you could even drive your 300Bs with transistors, power the amp with an outboard switch-mode supply, add user-adjustable negative feedback that you can control from your telephone, or build it into a carbon-fiber box topped with ostrich leather—all as unthinkable as making a martini with vodka instead of gin.

I've never heard a single-ended 300B amp that I disliked. That said, these days my favorite examples are the ones whose sound steers clear of the excessive sweetness and thickness that some people associate with the genre. Such preconceptions are not groundless: In the mid-1990s, when I tried my first single-ended 300B amp, a Cary 300SEI integrated, the trend among manufacturers and DIY hobbyists was toward passive parts and circuit designs known for compounding rather than offsetting the 300B tube's inherent warmth (footnote 1). In the 1990s, at least in the US, it was difficult to find a single-ended 300B amplifier that sounded as clear and as musically precise—let alone as emotionally compelling—as the Air Tight ATM-300R. But I'm getting ahead of myself . . .

Description

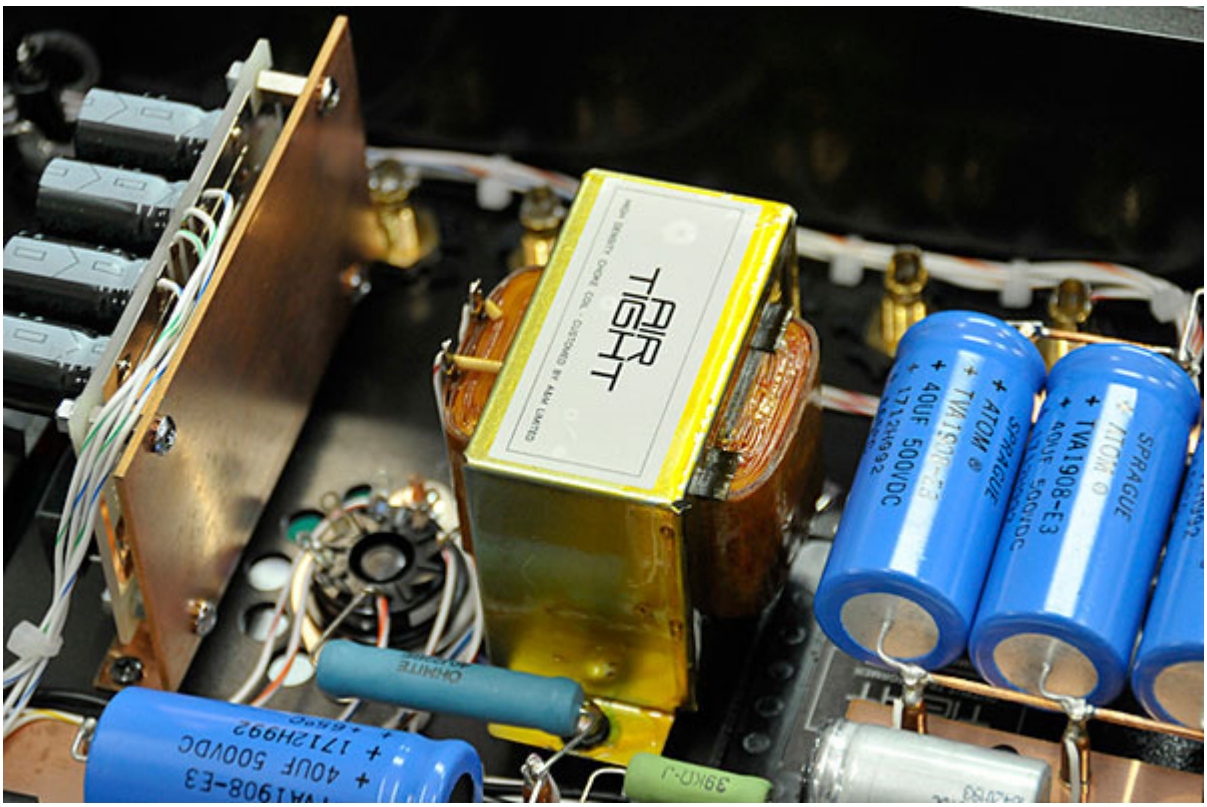
The ATM-300R ($16,995 with Electro-Harmonix 300B output tubes, $15,995 without) is the latest incarnation of a design that made its commercial debut in 1999, as the ATM-300—then as now, a single-ended amplifier that uses one 300B directly heated triode per channel to produce 8Wpc. The third product in this lineage—Air Tight's *second* single-ended 300B amp, a limited-edition product called the ATM-300 Anniversary, was issued in 2016—the ATM-300R improves on its forebears in various ways. Perhaps the most significant of these is the change to a hand-wound, paper-wrapped choke coil for the power supply, in tandem with a hand-wound, paper-wrapped mains transformer—both designed and made in-house. According to Air Tight's Yutaka "Jack" Miura, son of company founder Atsushi Miura, the new iron results not only in better sound but in slightly higher output: 9Wpc for the 100V version sold in Japan. (For the 120V US version Air Tight retains the 8Wpc rating, apparently motivated by prudence.) Jack Miura also points to the new model's redesigned power supply, and its use of a brand-new output-transformer design from Japanese transformer specialists Tamura.



One thing the first ATM-300 had that the ATM-300R lacks: a switch for selecting between zero negative feedback and 3 or 6dB of same. That said, the omission sets the stage for something more interesting: The ATM-300R has a fixed (unspecified) amount of feedback, yet in each channel, that loop's output tap is on the primary side of the output

transformer, not the secondary. As Jack Miura explained in an e-mail, "Taking NFB from the primary side . . . was used on very old amplifiers such as Western Electric, but not on recent amplifiers." He described the drawback of doing so as the need for a transformer capable of very stable performance—that and the fact that primary-side feedback doesn't produce overall signal/noise specs as impressive as those associated with the traditional approach. But Miura said that Air Tight's approach "opens-up" and enlarges the soundstage, and offers "crystal clear highs while keeping rich mids and tight bass, unlike the 'narrow shoulder' [sound] (this is how my father describes typical 300B tube amplifiers with wobbling bass sound and no sparkling highs)."

Other design distinctions of the ATM-300R: It's a three-stage design, using 12AU7 and 12BH7 dual-triode tubes—one each per channel—as voltage-gain stages and drivers, respectively. The high-voltage rail is rectified by a single 5U4BG two-part diode tube, supplemented with a slow-start circuit to prolong tube life. And the ATM-300R is an auto-bias (aka cathode-bias) design; an illuminated bias meter on the amp's front panel is intended not to aid in calibration but to provide confirmation that the 300Bs are operating within their intended range. The ATM-300R was designed by Y. Hayashiguchi and K. Hamada under the direction of Atsushi Miura.



Like all other Air Tight amps, the ATM-300R is built into an enclosure made mostly of bent and welded steel, to which a machined-aluminum front panel is attached with hidden fasteners. Inside, running nearly the amp's full width, is a solid-copper plate to which the signal tubes are fastened, and that serves as a signal ground plane. Except for a small, square circuit board to which some power-supply capacitors are fastened, the ATM-300R is entirely hand-wired, point to point—impeccably done. Insofar as I could tell, all component parts are contemporary, and include Sprague capacitors, Dale wire-wound resistors, and Alps potentiometers. With its dark-gray enamel finish and that unabashedly

cool-looking bias meter, the very *solid* Air Tight amp—at 54 lb, it's far heavier than its 16.9" by 10.8" footprint had led me to expect—was one of the most attractive amplifiers I've ever had in my home.

Installation and setup

Apart from its pushbutton power switch, the ATM-300R has only three user controls: separate Attenuation knobs for the left and right channels, and an identical knob, labeled Bias Tests, with three positions: Operate, L ch, and R ch. Especially with a high-gain amplifier, I love having the ability to knock down that gain at the amp, as needed, and these pots let me adjust the channel balance in a day and age when few preamplifiers come with Balance knobs.

Although its Tamura output transformers are wound with three secondary taps—for 4, 8, and 16 ohms—the ATM-300R's left- and right-channel outputs offer a choice of two loudspeaker loads, labeled Low and High; the buyer specifies ahead of time which two of the three secondaries should be made active. (Although this can be changed in the field, it's not a job for the consumer, given how easily transformer windings can be ruined by poor soldering techniques.) On my review sample, the 4 ohm secondary was connected to the Low output, the 8 ohm secondary to High. I relied on the latter for all of my listening.

All of the tubes that came with my review sample were made by Electro-Harmonix. For $19,995, you can have an ATM-300R with Takatsuki 300B tubes, a combination I haven't heard.

Listening

The Air Tight ATM-300R spent a lot of time in my system chained to a chore no sane man or woman would think fair: playing, four times in a row, the historic recording by Georg Solti, the Vienna Philharmonic, and a cast of soloists headed by Kirsten Flagstad and George London, of Wagner's *Das Rheingold* (3 LPs, London OSA 1309). As it happens, a recent thread on Facebook had prodded me to re-read producer John Culshaw's book *Ring Resounding*, about his production of that historic first complete recording of *Rheingold* and, ultimately, Wagner's entire *Der Ring des Nibelungen*. The Air Tight amp reproduced it so gloriously well that, for the next couple of days, one or the other of the set's three LPs was always on my turntable.

Culshaw's *Rheingold*, made in 1958, was the first recording to exploit stereo technology's ability not only to reproduce the spatial characteristics of a recorded performance, but to re-create, for the listener, spatial effects created entirely in the studio, including the singers' relative positions on an imaginary stage and their movements across that stage as they perform. Through the Air Tight, that stage was notably larger than through most amps; indeed, it was considerably larger than with other tube amps of my experience that use negative feedback—something I associate with amps whose spatial performance is precisely detailed but lacking in scale at the large end of the spectrum.

In recording Scene iii of *Rheingold*, Culshaw and engineer Gordon Parry devised a way to portray the dwarf Alberich (baritone Gustav Neidlinger) as having rendered himself invisible in order to attack his brother, Mime (tenor Paul Kuân): They recorded Neidlinger in an isolation booth to make his voice sound separate from the rest of the recorded space—an effect that the producers of live performances have tried but reportedly failed to pull off. (Originally, the baritone portraying Alberich would slip backstage and sing through an elongated horn of Wagner's own design.) Through the ATM-300R, those effects were eerily convincing; even more so was the physical, forceful sound of

Alberich's whip. The ATM-300R also did well with another special effect cooked up for the orchestral interludes between scenes ii and iii and between iii and iv: the sounds of the Nibelung workers whom Alberich has enslaved, hammering away at his gold. For this, Culshaw and his assistants located and rented 18 anvils of different size, on which his percussionists played, with various types of hammers, the rhythmic patterns Wagner had written for these passages. The effect sounds like noise through lesser gear, yet was clear, precise, and, again, *forceful* through the Air Tight.

The ATM-300R did more than just an impressive job with this recording's spatial effects. The sounds of the brasses in various recurrences of the Valhalla leitmotif were spine-tinglingly beautiful and just plain *right* through this amp—as was every note sung by Fricka (Kirsten Flagstad) and, even more so, Freia (Claire Watson). And in the opening measures of the Prelude, the low E-flat on the double basses had tremendous—but not overblown—depth and power, and far greater clarity of pitch than I've heard through any other 300B amplifier, bar none.

Another multidisc set that I listened to more than once through the ATM-300R amp was the 1972 recording of Elgar's oratorio *The Dream of Gerontius*, directed by Benjamin Britten, with Peter Pears *et al* and the London Symphony Orchestra and Chorus (2 LPs, London OSA 1293). I dare say the Air Tight's presence in my system was a major factor in pushing me toward Britten's interpretation, which is generally brisker but no less emotionally powerful than Sir Adrian Boult's more stolid, stentorian, broader-paced recording with Nicolai Gedda *et al*, the New Philharmonia

Orchestra, and the London Philharmonic Chorus (2 LPs, EMI SLS 987). The ATM-300R clarified some of the scoring for choir and woodwinds alike, without sacrificing the opulence of the LSO's string tone, but it was the way it reproduced the big orchestral bass drum that really won me over: The combined forces of the 8Wpc Air Tight and the woofers of my DeVore Fidelity Orangutan O/93 speakers created bass fundamentals that were impressively, thunderously powerful yet perfectly clear of pitch, without wobble or excess boom.

After spending so much time listening to George Bernard Shaw's two favorite composers, I found myself in the mood to hear something from Brahms, whom the playwright and occasional music critic—the latter under the name Corno di Basseto—held in contempt. The Air Tight did a lovely job with Rafael Kubelik and the Vienna Philharmonic's recording of Brahms's Symphony 1 (LP, London CS 6016). String and woodwind tones throughout were lusciously textured and colorful, but not pushed to unrealistic extremes in those regards: tones were beautiful *and* faithful. The kettledrum in the introductory measures had realistic force, and a convincing increase in intensity leading to that portion's climax. In the scherzo-like third movement, both the clarinet's tone and the believability of the air surrounding it in the recording space were remarkable—and the ATM-300R conveyed the rhythmic change as the bubbly first part led into the more accented rhythms of the Trio section. The sound was consistently involving, and held my attention right through the smooth transition into the final movement, with the swooping strings allowed a believable sense of scale: Here, as in *Das Rheingold*, the Air Tight was capable of letting the music sound *big*.

In my next day of listening I reached for something entirely different: Neil Young's "Cortez the Killer," from his *Zuma* (LP, Reprise MS 2242). Throughout its weeks in my system, the Air Tight amp proved not the least bit bright, yet it gave an almost startlingly detailed presentation of this familiar recording—details of musical nuance, such as when Young briefly uses the heel of his right hand as a mute near the bridge of his guitar while raking the strings, and spatial cues that describe the positions on the soundstage, from side to side and from front to back, of Young's voice and solo guitar. Interestingly, with the ATM-300R, all of Young's vocals, portions of his guitar solos, and even some sounds from the drums—*eg*, a rim shot that sounded accidental—came farther forward from the speakers as they grew not only in loudness but in physical intensity. I noticed the same effect from the congas in the album's next and final song, "Through My Sails."

Solo-piano music was also to the Air Tight's liking. Henriette Faure's decidedly romantic playing on her recording of Book 1 of Debussy's *Préludes* (LP, EMI 350 C 004/Electric Recording Company ERC 006) was very well served by the ATM-300R, which followed, apparently faithfully, Faure's dynamic shadings, her variable tempi, and the texture of playing (as distinct from the texture of the sound) she brought to arpeggiated chords and the like: a lovely experience. The piano sounded stringy—appropriately so, I think—with generous *purr* and every last ounce of the low-octave power I hear from this record through more powerful amps. Indeed, the ATM-300R's sound remained poised—clean, not harsh—during the loudest moments of *Prélude 7*, *Ce qu'a vu le vent d'ouest*: No thickness of sound intruded to betray the amp's modest power reserves.

Conclusions

Unfortunately, although Cary Audio's similarly priced CAD-805RS single-ended monoblocks ($15,995/pair). immediately preceded the Air Tight ATM-300R in my system, I didn't have both here at the same time, for a direct comparison. But my memory of the big Carys' sound was sufficiently fresh that I can say, with assurance, that while the US-made amp produced somewhat wider stages than the Air Tight, the latter managed to sound bigger overall, apparently by dint of its greater sense of spatial depth. An even more audible difference was the absence, in the ATM-300R's sound, of the goosed-up bass that characterized the Cary's.

Also by comparison, my Shindo Laboratory Haut-Brion sounded a mite richer and more lush than the Air Tight, but not as powerful and tight in its lowest octaves: I keep coming back to how scary-good the orchestral bass drum in Britten's recording of Elgar's *The Dream of Gerontius* sounded through the ATM-300R.

In all, the Air Tight ATM-300R impressed me as an amplifier whose only flaw derived from the prescribed limitations of its breed: its low power relative to most other domestic amplifiers. Because it requires loudspeakers of higher-than-average efficiency—*ie*, high electrical sensitivity combined with consistently high impedance—the ATM-300R is not for everyone. Fair enough: Criticizing a single-ended 300B amp for its low power is like criticizing a haiku for its limited narrative. To put it another way: Being disappointed in a 300B for not offering Herculean levels of power is like being disappointed in *The Seventh Seal* for not including a car chase.

As I write this, I'm one or two weeks away from moving my playback system from my smallish living room to my recently expanded family room—at which time my extremely efficient Altec Flamenco loudspeakers will end their exile (think: Wilford Brimley in John Carpenter's *The Thing*) and rejoin my system. I hope I'll be able to keep the Air Tight amp long enough to try it with those speakers; I also wouldn't turn down an opportunity to hear it with the Takatsuki output tubes (hint, hint). Even so, based on my experiences with it during the last few weeks, the Air Tight ATM-300R stands alongside the Shindo Laboratory D'Yquem, the Lamm Industries ML2.2, the original (Japanese) Audio Note Ongaku, and my own Shindo Haut-Brion as one of the finest amplifiers I've ever heard.

Footnote 1: And that Cary had as its standard output tubes Cetron 300Bs—a tube once plentiful and underappreciated, now rare and lamented.

Art Dudley returned to the Air Tight ATM-300R in November 2019 (Vol.42 No.11):

Nine months ago, while I was busy reviewing Axiss Audio's Air Tight ATM-300R single-ended power amp ($16,995 with Electro-Harmonix output tubes), my new old house was still new to me, and I hadn't succeeded at getting my 1966 Altec Flamenco loudspeakers to sound consistently good in its 11' by 16' living room. So before I made my listening notes on the Air Tight, I banished my Altecs to the garage—temporarily, of course, until such time as I knew how to get them to sing in their new setting—and relied instead on my DeVore O/93 loudspeakers, which took to my new living room like Unitarians to a vegan picnic.

Not long after, I hired a contractor to remove a closet from the house's family room, an alteration that netted me a 12' by 17' space in which my playback system sounds *much* better—even my Altec Flamencos, freshly back from exile. Indeed, in this space, the very large Altecs were less finicky than in my previous home: Here they exhibited a surprising ability to sound their best when aimed straight ahead (*ie*, no toe-in), ultimately rewarding me with a larger-than-ever sense of scale and smoother upper mids and lower trebles when heard from a more or less centrally located listening seat.

Because the single-ended ATM-300R has a rated power output of only 9Wpc, and the Altec Flamenco has even higher efficiency than the DeVores, there was no way I could send the former back to its distributor without trying the two products together. The combination proved a brilliant one, the Air Tight Amp sounding a little less rich than my Shindo

Haut-Brion but offering greater spatial depth and, more important, tighter, snappier musical timing, especially on lower-pitched instruments.

Returning to a record that featured prominently in my original ATM-300R review, the Georg Solti/Vienna Philharmonic/Kirsten Flagstad *et al* recording of Wagner's *Das Rheingold* (3 LPs, London OSA 1309), the Air Tight performed brilliantly. It found on this recording, and coaxed from my Altecs, a heretofore unheard degree of stage depth—yet when the voices in the first scene were upstage, the positions of those singers and the physicality of their voices were well defined. By comparison, my Shindo Haut-Brion, though superior in the degree of *thrust* it gave to cellos and double basses, sounded spatially vague. String texture through the Air Tight amp was to die for: generous but not exaggerated, and allied to gorgeous, realistically rich timbres, especially the violins.

Most important of all, the Air Tight rivaled the Shindo in presenting this recording not as mere (attractive) sound but as music. Listening to the introductory bars with the Air Tight amp in my system, the timing was clearer than ever: Rather than getting lost in a mushy maelstrom of sound, the entrance of each instrument/group was as precise as it was hypnotic. And for once the first Rhinemaiden's entrance didn't surprise me: Because I found it easy to follow the beat through this temporally clear amp, I knew right when it was going to happen.

Really: If I wanted to show someone what's special about this John Culshaw-produced recording, I would play it for them with the Air Tight driving my Altecs.

Through the combination of Air Tight and Altecs, yet another classical recording proved revelatory: Nathan Milstein's recording of the Bach D-minor Partita from his box set of the complete Sonatas and Partitas (3LPs, Deutsche Gramophone 2721087). It's a very reverberant recording— whether naturally or not, I have no idea—and especially on an up-tempo movement like the Gigue, that quality can compromise the momentum of the performance: the sense of the player leaning into the music. With the Air Tight in the system, I heard momentum and drive like never before; compared to my Shindo amp, I was getting less room and more fiddling. On top of that, Milstein's more forceful note attacks in the famous Chaconne sounded downright fierce.

On the Sir Adrian Boult/New Philharmonia recording of Elgar's *The Dream of Gerontius* (2 LPs, EMI SLS 987), when the priest (bass Robert Lloyd) enters at the end of Part One, the effect through the Air Tight was magnificent. Lloyd's voice sounded rich, clear, and powerful, and was presented in a manner that was considerably more spatially complex, for want of better words, than through my Haut-Brion: There was space around his voice, and I could sense if not quite hear the locations of the instruments behind him—a strange thing indeed. The sense of scale was perfect: On this track, orchestra, soloist, and (eventually) choir were every bit as huge as they should have been.

But, again, that's just sound; more important was the Air Tight's musical acumen—the way it made clear the dramatic tension when Lloyd drew out the end of the lines "de hoc mundo" and "Go from this world": The effect was breathtaking.

The Air Tight/Altec combo proved no less capable with rock and jazz. On Procol Harum's "Butterfly Boys"—the best-sounding track on the generally well-engineered *Exotic Birds and Fruit* (LP, UK Chrysalis CHR 1058, footnote 1)—the ATM300R equaled my Haut-Brion in texture, color, musical timing, and sheer force, and added greater insights into the sounds of the instruments, especially the wheeze of Chris Copping's Hammond organ/Leslie speaker combination, and the ever-moving, ever-changing patterns that Alan Cartwright plays on his Fender Precision bass, in great part the real driving force behind this up-tempo number.

The only track on which this amp didn't shine completely was "Hat and Beard," from Eric Dolphy's *Out to Lunch!* (2 45rpm LPs, Blue Note/Music Matters ST-84163). The sounds of Bobby Hutcherson's vibes bloomed colorfully and had perfectly balanced note attacks, and Richard Davis's often complex double-bass lines were laid out clearly. But all the instruments, especially Dolphy's bass clarinet, sounded a little smaller than they should have. By comparison, my Haut-Brion was a bit bigger and, for want of better words, friendlier and more inviting: It made more sense of this challenging music.

In the wake of my original review, Air Tight's US distributor agreed to try to supply a loaner pair of the premium-quality Takatsuki TA-300B output tubes that Air Tight offers as an extra-cost option. (New ATM-300Rs retail for $19,995 when supplied with the Takatsukis.) Unfortunately, that never happened, but I did try a pair of Gold Lion PX300B tubes I had on hand: easy enough to do, given the ATM-300R's auto-bias design. (Rather than applying to the signal grids a fixed negative voltage—the very thing that requires precise setting and adjusting in fixed-bias amps— Air Tight connects the grids to ground and uses a resistor to raise the positive voltage on the cathodes.) I heard little if any audible change—if anything, the trebles were very slightly grainier with the Gold Lions. People whose opinions I hold in high regard have praised the Takatsuki tubes, so I won't rule out the possibility that they might allow the Air Tight amp to sound even better.

And as it stands now, the ATM-300R is already a fine-sounding amp—exceptionally so, in the truest sense of that word. When paired with sympathetic (read: high-efficiency) loudspeakers, this heirloom-quality artisanal amplifier stands with a select few that can reasonably be regarded as the best.—**Art Dudley**

Footnote 1: But oh! the heavy-handed reverb!

Measurements

I measured the Air Tight ATM-300R with my Audio Precision SYS2722 system (see the January 2008 "As We See It"). Before doing any testing, I checked the ATM-300R's front-panel meter to ensure that the bias was correctly set for the two 300B output tubes.

The Air Tight's maximum voltage gain into 8 ohms from its High (8 ohm) output-transformer tap, which was how Art Dudley listened to the amplifier, was a high 29.5dB; from the Low (4 ohm tap) it measured 26.9dB. Both output taps preserved absolute polarity (*ie*, were non-inverting). The input impedance was a usefully high 78.5k ohms at low and middle frequencies, dropping to a still-high 54k ohms at 20kHz. The output impedance from the 4 ohm tap was low for a single-ended tube design, at 0.84 ohm at 1kHz, rising to 1 ohm at 20Hz and 20kHz. From the 8 ohm tap, the output impedance was 1.2 ohms at 1kHz and 2 ohms at 20Hz and 20kHz, these values still low for this kind of amplifier. As a result, the response with our standard simulated loudspeaker varied by ±0.8dB (fig.1, gray trace).

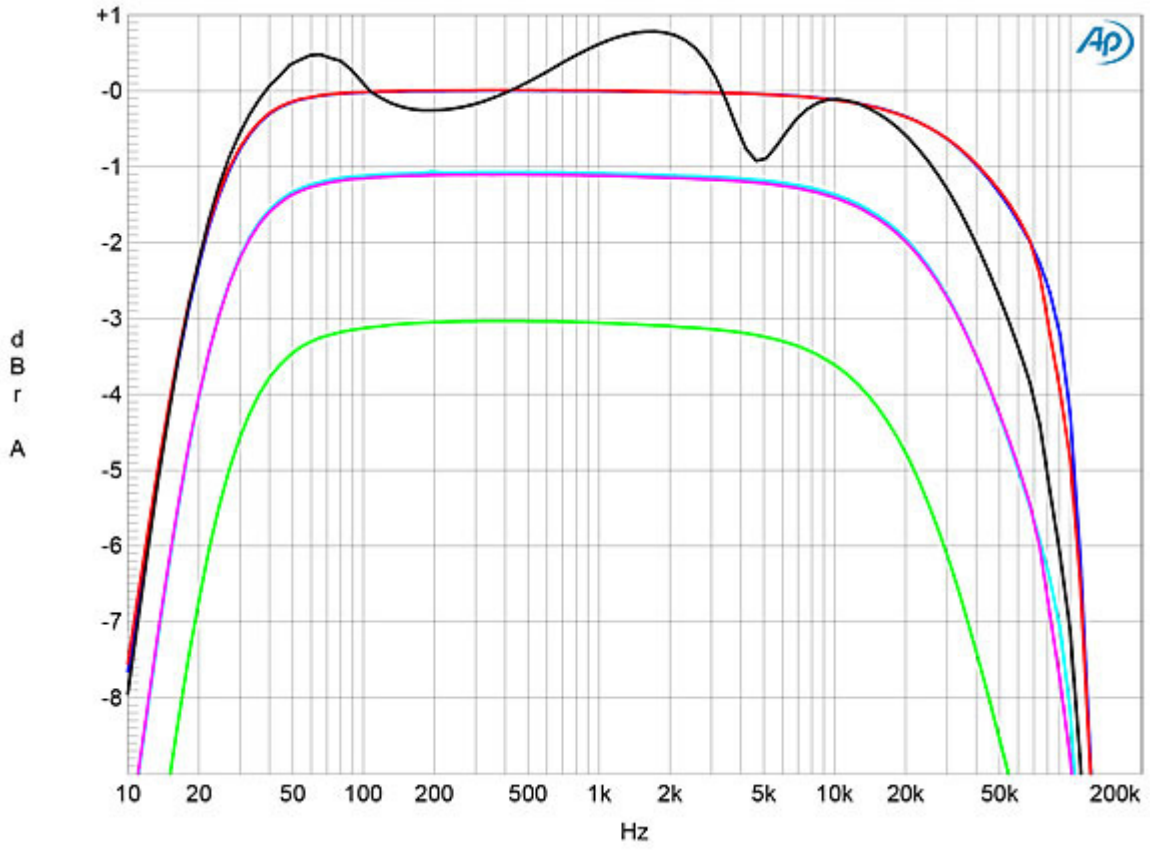


Fig.1 Air Tight ATM-300R, 8 ohm tap, frequency response at 2.83V into: simulated loudspeaker load (gray), 8 ohms (left channel blue, right red), 4 ohms (left cyan, right magenta), 2 ohms (red) (1dB/vertical div.).

Fig.1 shows that the ATM-300R's audioband response is flat up to 10kHz, with a small amount of rolloff in the top octave reaching –0.3dB at 20kHz into 8 ohms (blue and red traces), but –1.8dB into 2 ohms (green). The top-octave

rolloff was lower from the 4 ohm tap, but now a low-level peak was evident around 150kHz, this associated with a small amount of overshoot or ringing with a 10kHz squarewave from this tap (fig.2). A 1kHz squarewave was reproduced with flat tops and bottoms from both taps (fig.3), suggesting excellent output-transformer design.

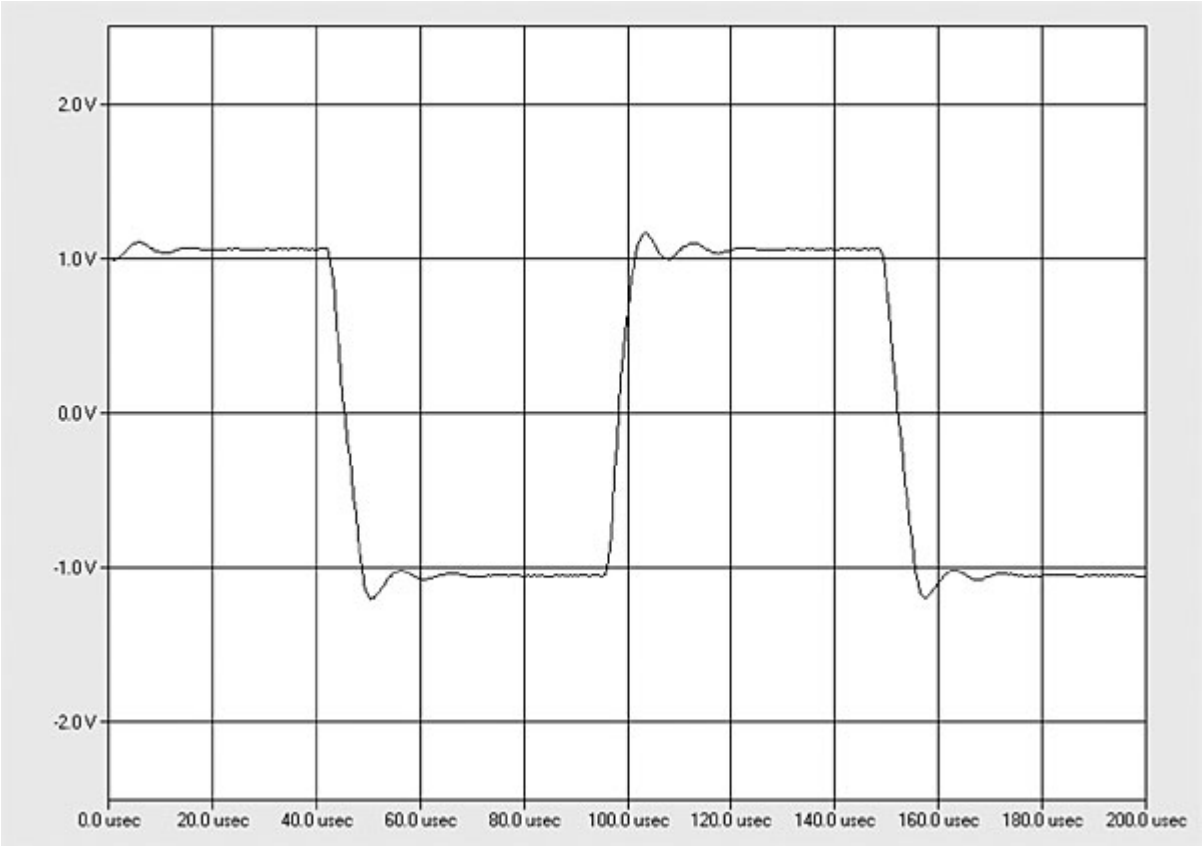


Fig.2 Air Tight ATM-300R, 4 ohm tap, small-signal, 10kHz squarewave into 8 ohms.

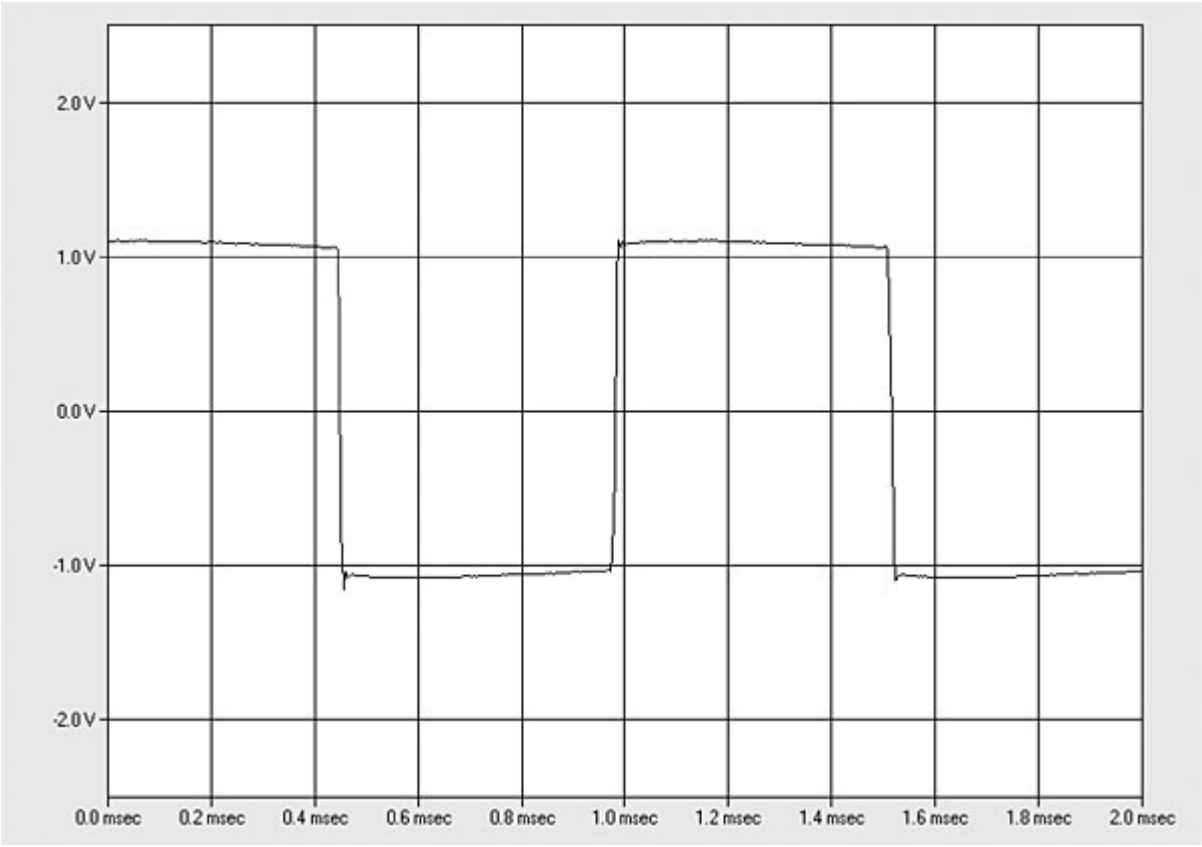


Fig.3 Air Tight ATM-300R, 4 ohm tap, small-signal, 1kHz squarewave into 8 ohms.

The ATM-300R's channel separation, measured at a level close to clipping into 8 ohms, was 87dB L–R and 77dB R–L at 2kHz, but these decreased at the frequency extremes (fig.4). The reduction at high frequencies is presumably due to capacitive coupling between the channels somewhere in the circuit; at low frequencies, it suggests an increasing power-supply impedance as the frequency drops. The wideband, unweighted signal/noise ratio, ref. 2.83V and measured with the input shorted to ground but the level controls set to their maximum, was a moderate 71dB in the left channel and 67dB in the right. These ratios improved slightly, to 71.3dB, when the measurement bandwidth was restricted to the audioband, and to 87.5dB when A-weighted. Spectral analysis of the Air Tight's noise floor (fig.5) revealed spuriae at 60Hz and its odd- and even-order harmonics. All of these spuriae are sufficiently low in level that they will not be audible as hum; also notable in this graph is the absence of the low-frequency random noise that is often present with tube designs.

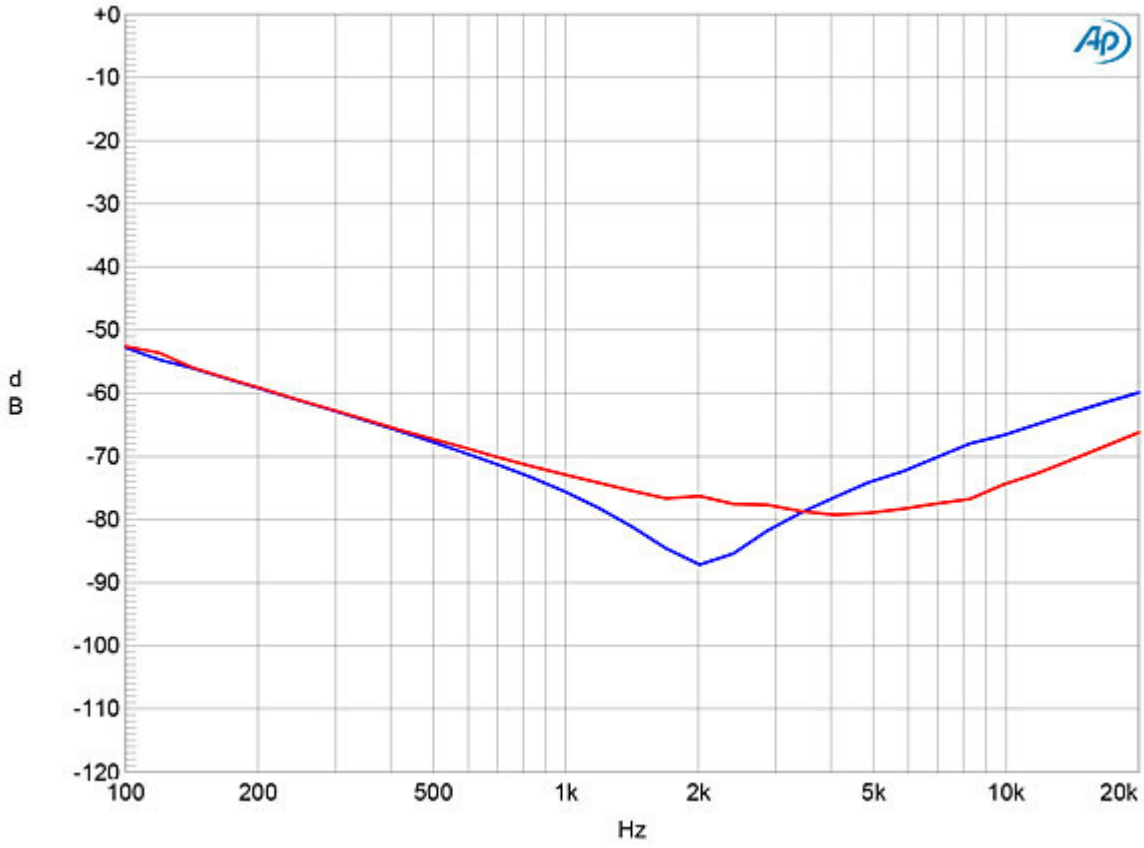


Fig.4 Air Tight ATM-300R, channel separation ref. 6V into 8 ohms (L–R blue, R–L red, 20dB/vertical div).

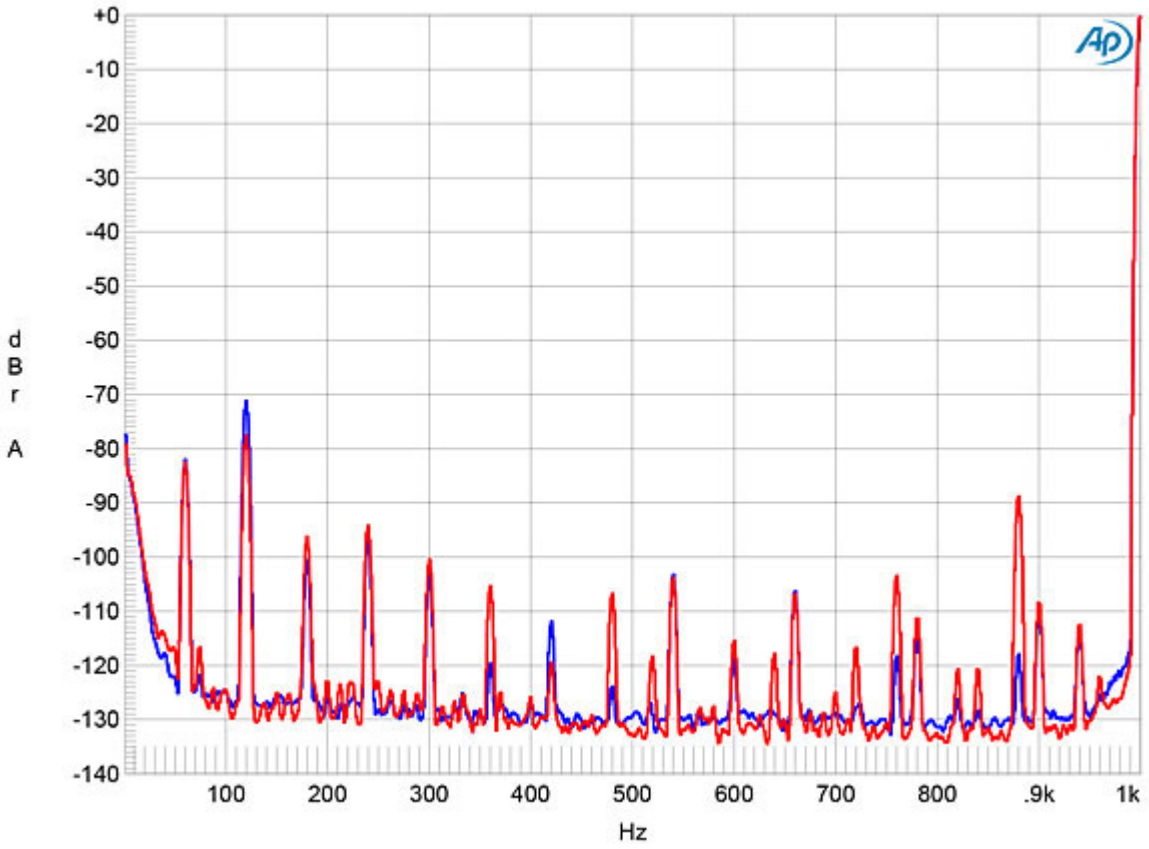


Fig.5 Air Tight ATM-300R, 8 ohm tap, spectrum of 1kHz sinewave, DC–1kHz, at 1W into 8 ohms (linear frequency scale).

The ATM-300R is specified as being able to deliver 8Wpc (9.03dBW), presumably with the load matched to the nominal output-transformer tap. With "clipping" defined as when the THD+noise reaches 1%, fig.6, taken from the 8 ohm tap with both channels driven, indicates that the Air Tight clipped at 3.65Wpc into 8 ohms (5.6dBW). Relaxing the definition of clipping to 3% THD+N, the Air Tight clipped at 9Wpc (9.54dBW). Into 4 ohms (fig.7), the ATM-300R's 8 ohm tap delivered 4.5Wpc (6.5dBW) at 3% THD+N. From its 4 ohm tap, the ATM-300R clipped (3% THD+N) at 9W into 8 ohms (fig.8) and 4 ohms (not shown). Figs. 5–8 reveal that the distortion rises linearly as the power increases, which is typical for an amplifier with a single-ended output stage; however, the distortion at low powers is higher than that of the single-ended but solid-state First Watt SIT-3 reviewed elsewhere in this issue.

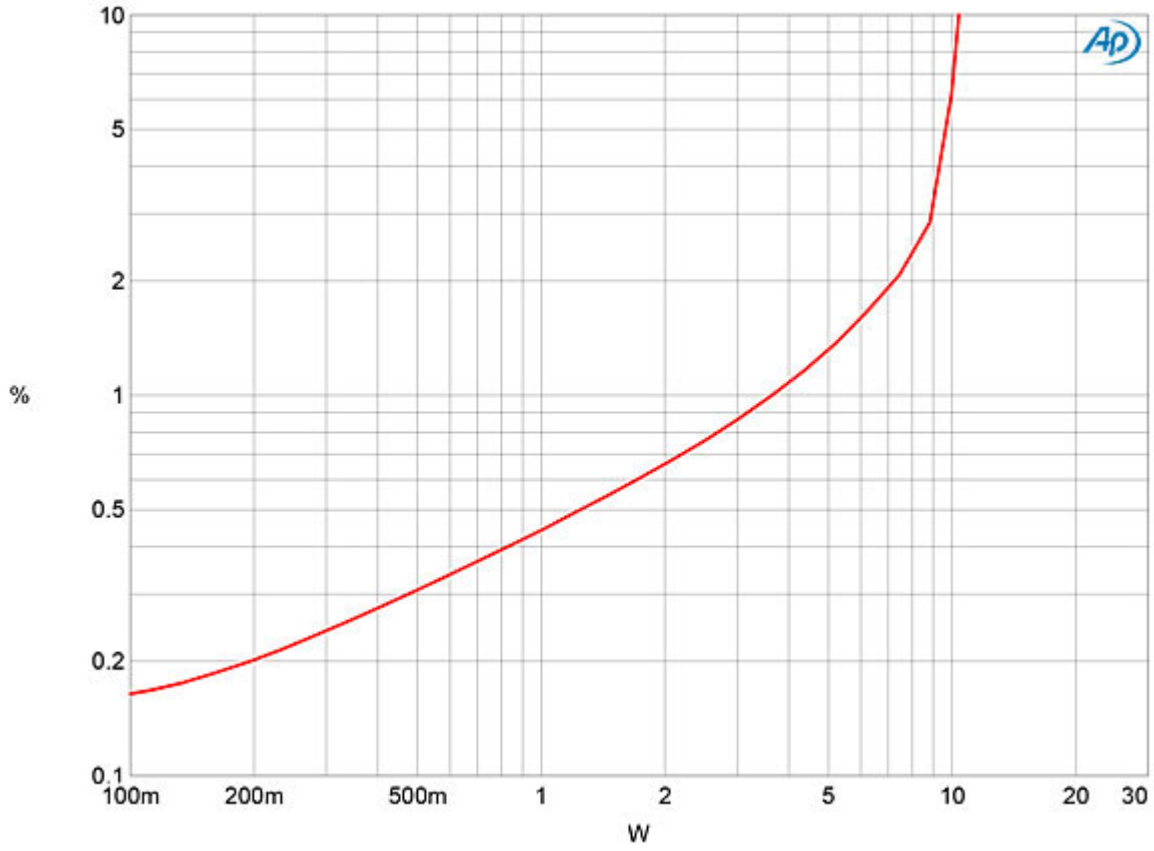


Fig.6 Air Tight ATM-300R, 8 ohm tap, both channels driven, distortion (%) *vs* 1kHz continuous output power into 8 ohms.

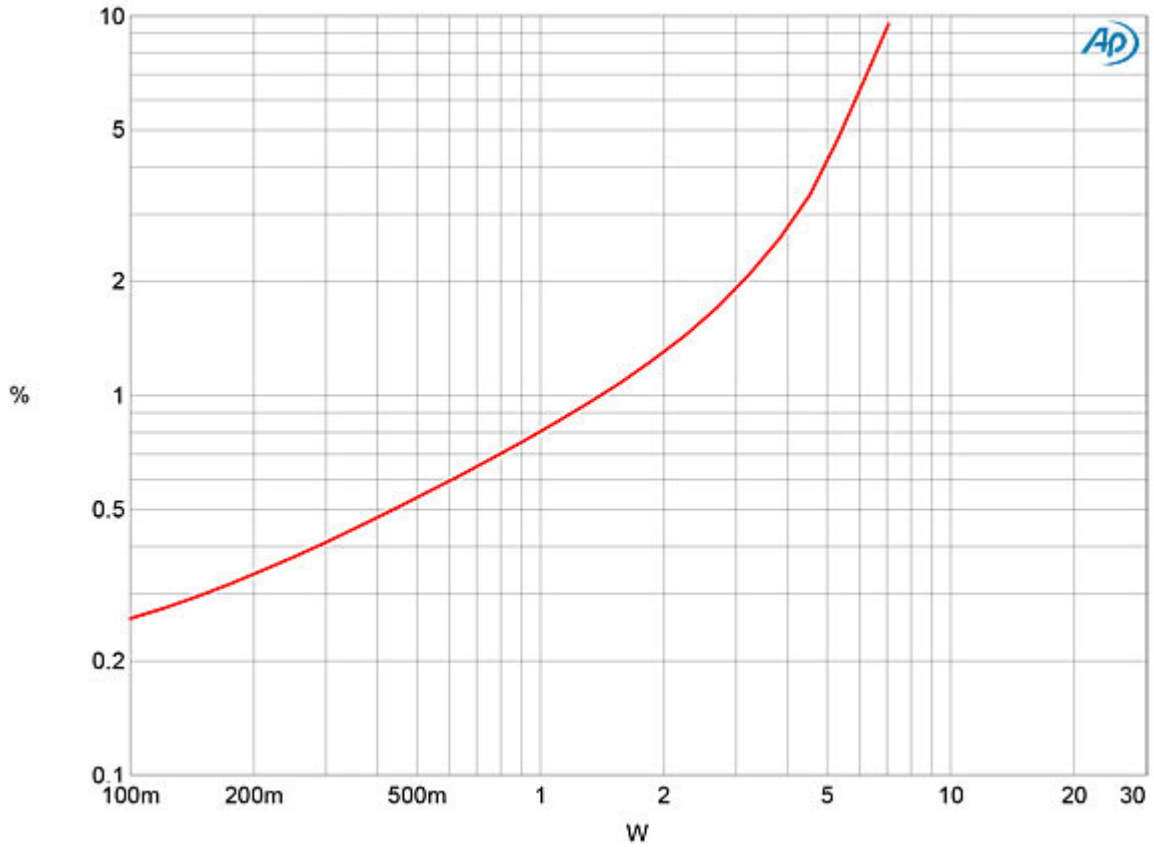


Fig.7 Air Tight ATM-300R, 8 ohm tap, both channels driven, distortion (%) *vs* 1kHz continuous output power into 4 ohms.

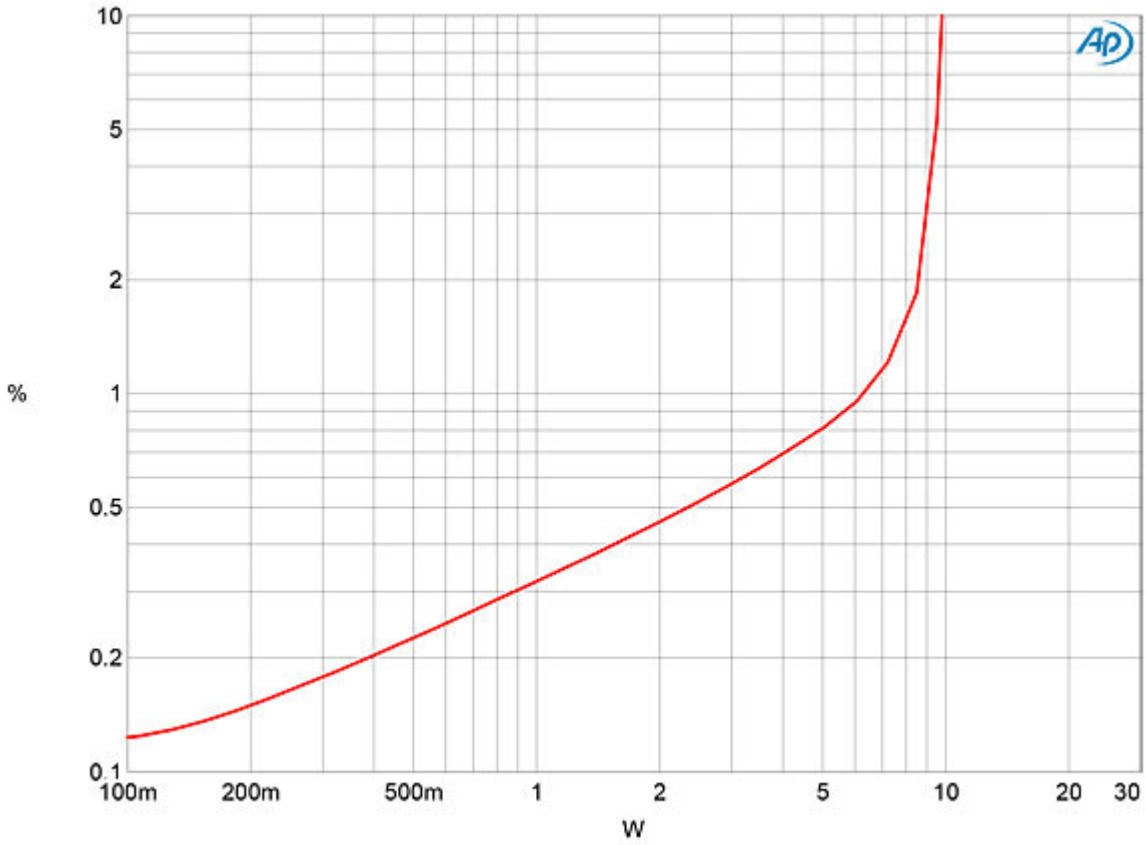


Fig.8 Air Tight ATM-300R, 4 ohm tap, both channels driven, distortion (%) *vs* 1kHz continuous output power into 4 ohms.

Like that First Watt amplifier, the Air Tight ATM-300R offered levels of distortion that remained relatively constant with frequency but that increased into lower impedances (fig.9). The rise in THD+N at low frequencies was small, which again suggests an excellent output transformer with a sufficiently hefty core. This graph was taken from the 8 ohm tap; distortion levels from the 4 ohm tap (fig.10) were just half those from the 8 ohm tap.

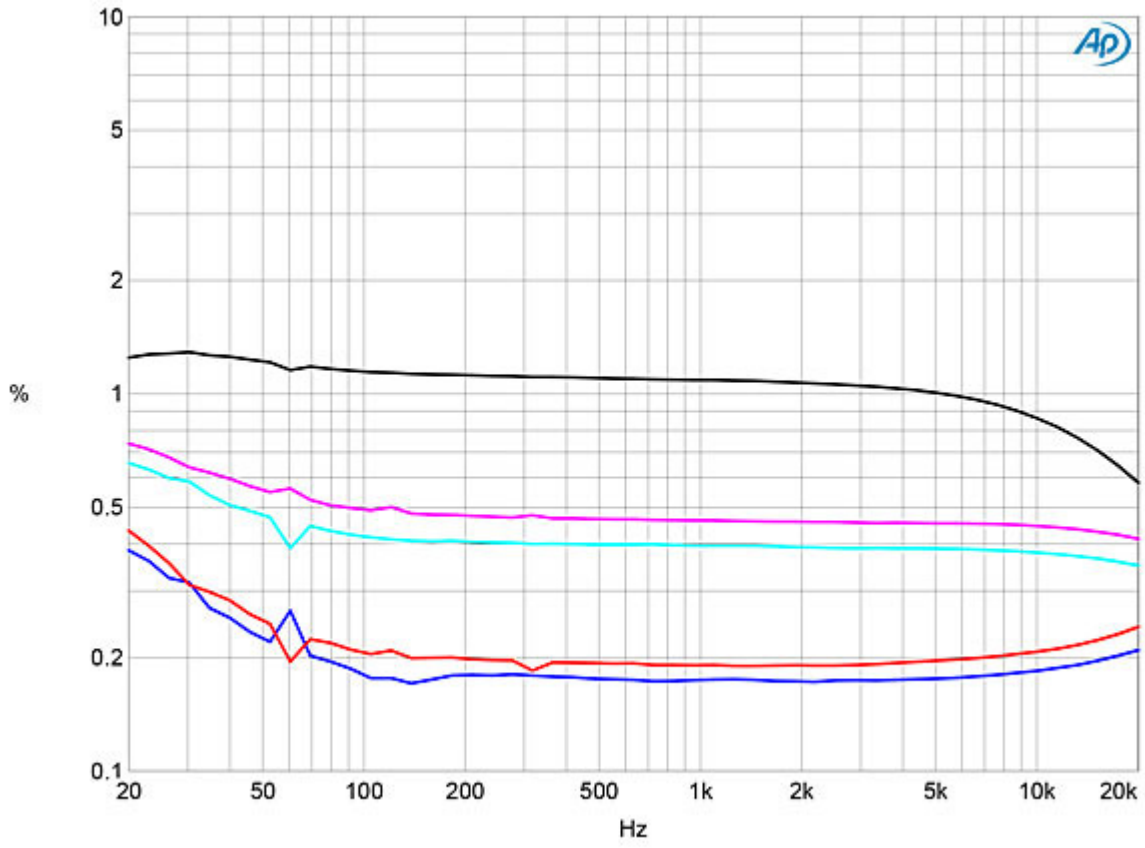


Fig.9 Air Tight ATM-300R, 8 ohm tap, THD+N (%) *vs* frequency at 1V into: 8 ohms (left channel blue, right red), 4 ohms (left cyan, right magenta), 2 ohms (left gray).

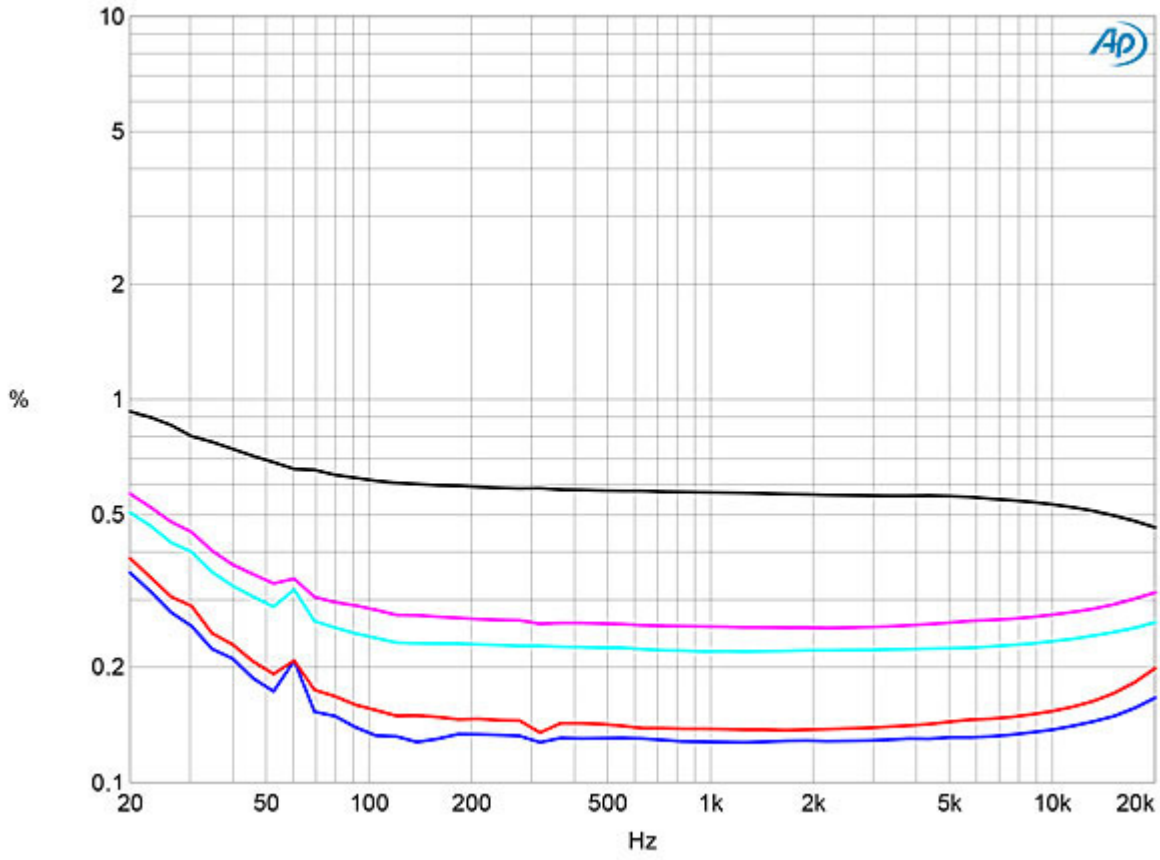


Fig.10 Air Tight ATM-300R, 8 ohm tap, THD+N (%) *vs* frequency at 1V into: 8 ohms (left channel blue, right red), 4 ohms (left cyan, right magenta), 2 ohms (left gray).

As with the First Watt SIT-3, the Air Tight's distortion was predominantly the sonically benign second harmonic, but this time in phase with the fundamental regarding the positive-going half cycles (fig.11). The third harmonic was around 22dB lower in level than the second harmonic (fig.12), but it both increased in level and got closer to the level of the second harmonic as the output stage was asked to deliver more current (fig.13). Tested with an equal mix of 19 and 20kHz tones at a low power into 8 ohms, the amplifier produced levels of higher-order intermodulation products that were relatively low (fig.14), though the second-order difference product lay close to –50dB (0.3%).

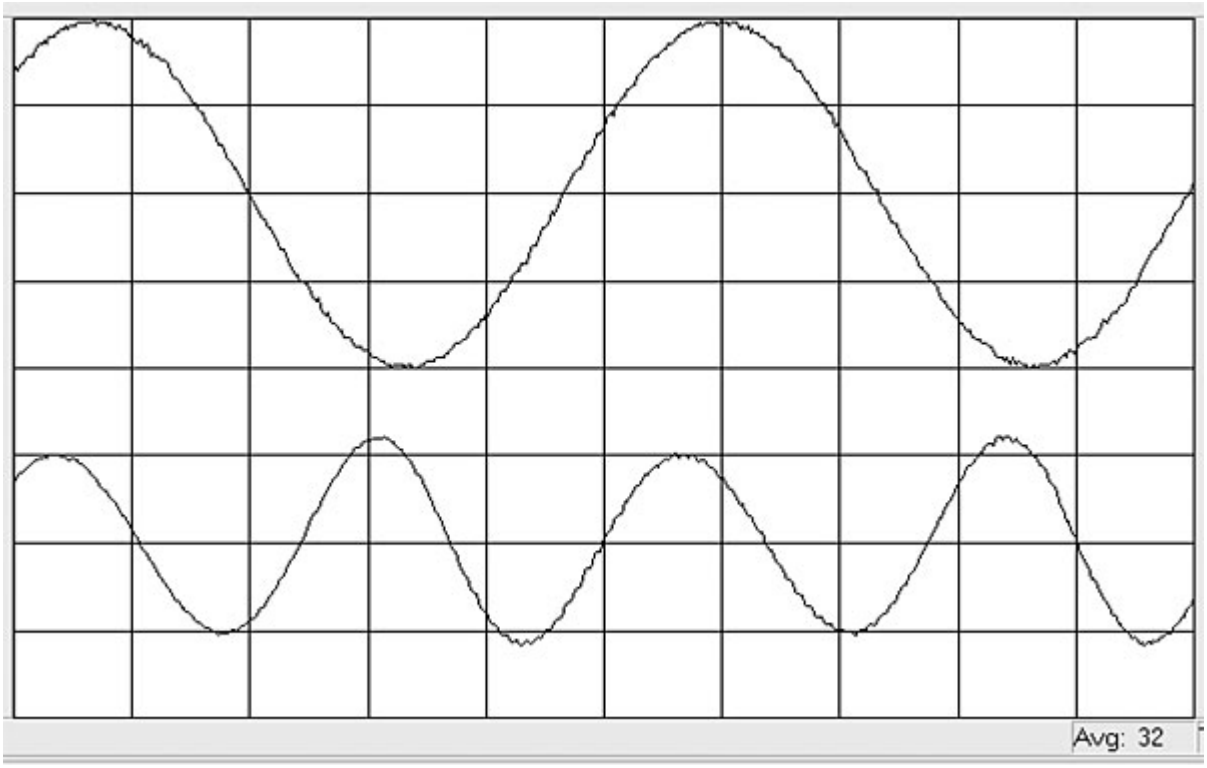


Fig.11 Air Tight ATM-300R, 8 ohm tap, 1kHz waveform at 1Wpc into 8 ohms, 0.44% THD+N (top); distortion and noise waveform with fundamental notched out (bottom, not to scale).

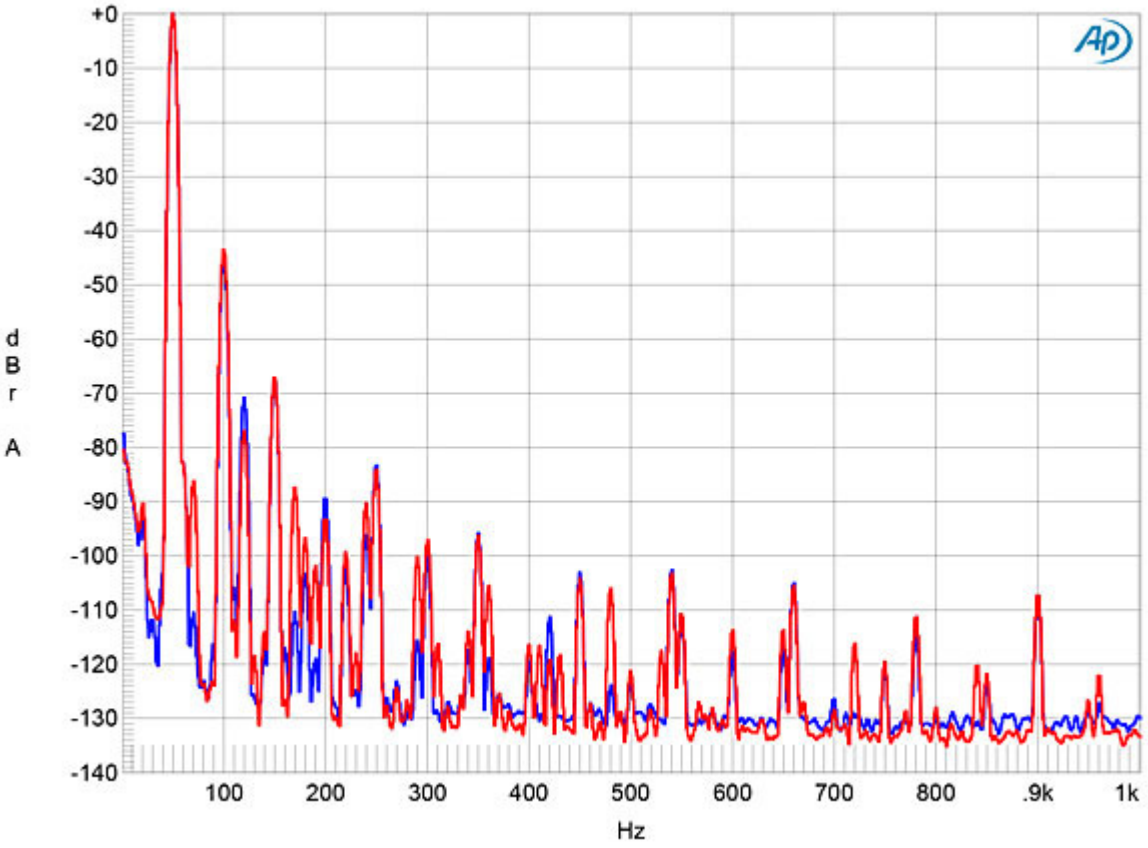


Fig.12 Air Tight ATM-300R, 8 ohm tap, spectrum of 50Hz sinewave, DC–1kHz, at 1Wpc into 8 ohms (linear frequency scale).

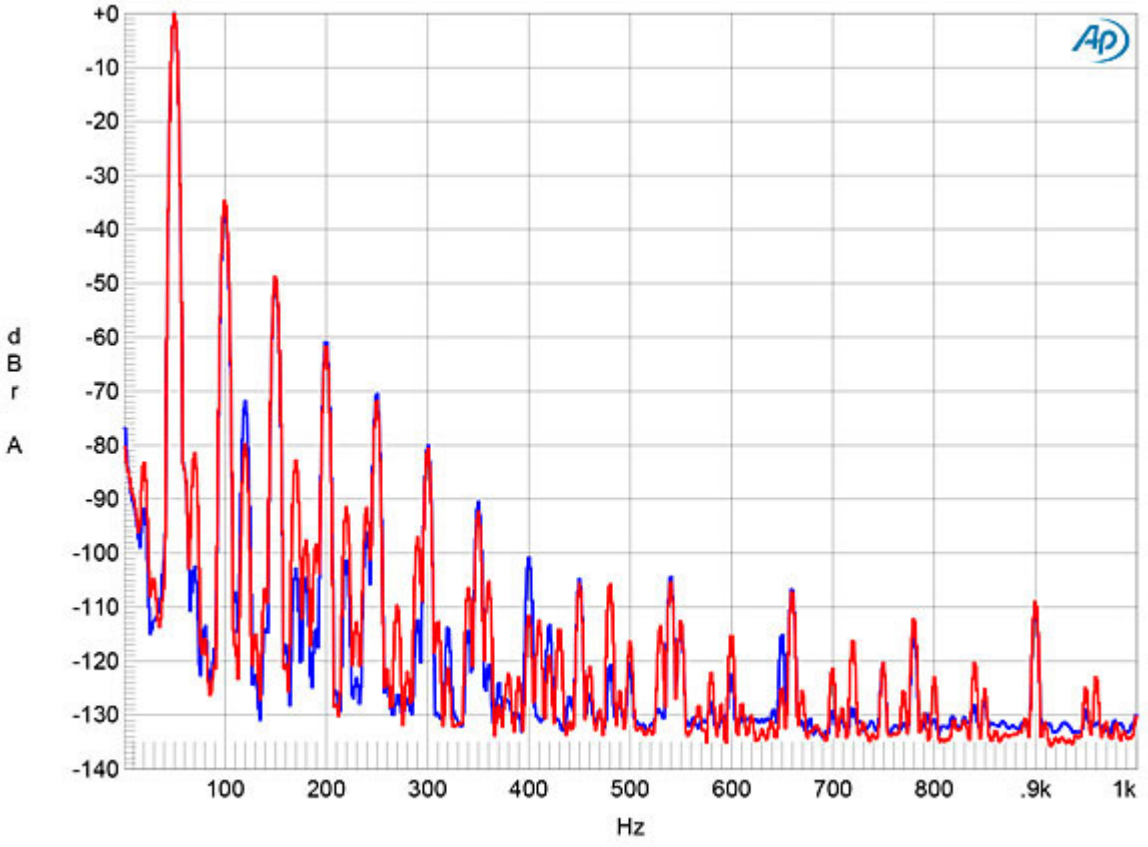


Fig.13 Air Tight ATM-300R, 8 ohm tap, spectrum of 50Hz sinewave, DC–1kHz, at 2Wpc into 4 ohms (linear frequency scale).

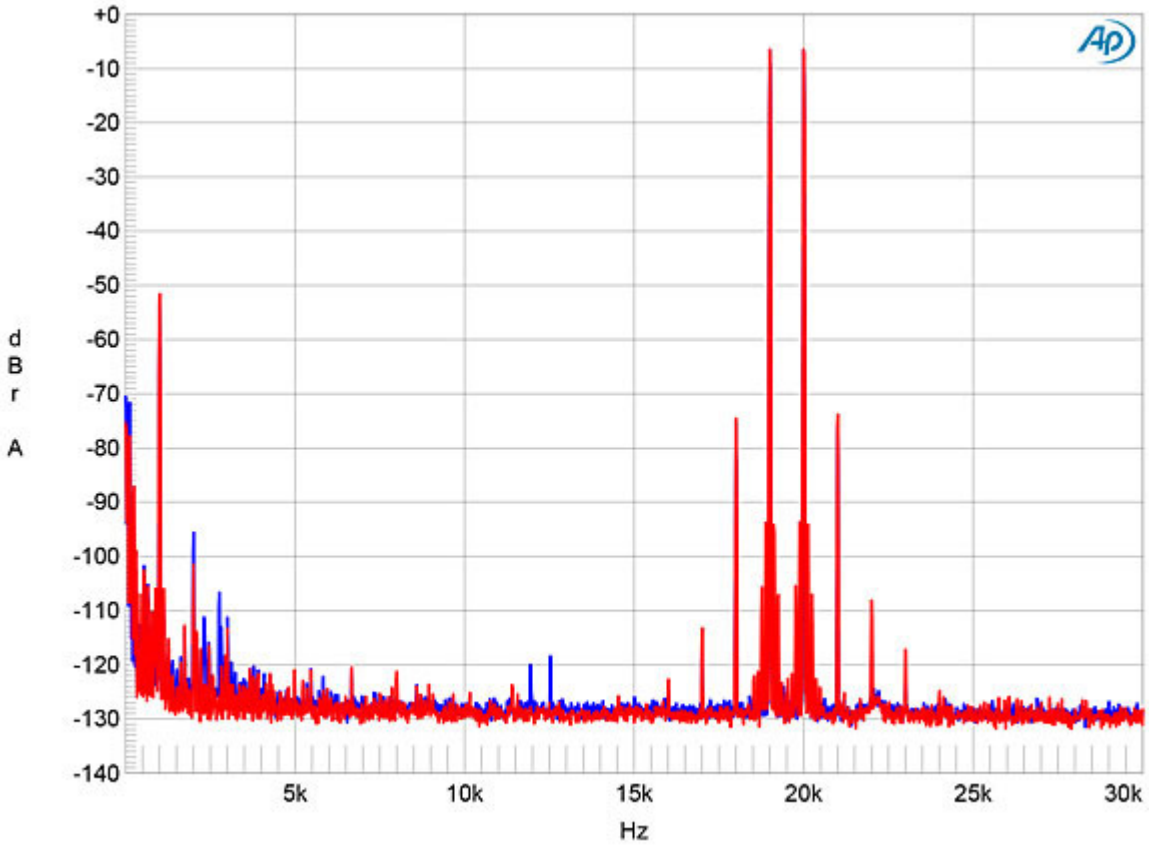


Fig.14 Air Tight ATM-300R, 8 ohm tap, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 1Wpc peak into 8 ohms (linear frequency scale).

The relatively high level of second-harmonic distortion comes with the territory in an amplifier having a single-ended output stage. Otherwise, Air Tight's ATM-300R appears to be well engineered. But it does need to be used with a loudspeaker with an impedance that doesn't drop below 8 ohms, like the DeVore Fidelity Orangutan O/93 that AD used for his auditioning.—**John Atkinson**

Description: (100V version): Tube complement: two 300B, two 12AU7, two 12BH7, one 5U4BG. Power output: 9Wpc at 5% THD (9.54dBW). Input sensitivity: 290mV at full output. THD: <1% (1kHz/1W/8 ohms). Damping factor: 7 (1kHz/1W/8 ohms). Frequency response: 25Hz–40kHz, –1dB/1W.

Dimensions: 16.9" (430mm) W by 9.65" (245mm) H by 10.8" (275mm) D. Weight: 54 lb (24.5kg).

Serial number of unit reviewed: 30005D.

Price: $16,995 with Electro-Harmonix 300B tubes; $19,995 with Takatsuki 300B tubes; $15,995 without 300B tubes. Approximate number of dealers: 18. Warranty: 3 years (tubes covered by their manufacturers' warranties).

Manufacturer: Air Tight, A&M Limited, 4-35-1 Mishimae, Takatsuki-city, Osaka 569-0835, Japan. Tel: (81) 72-678-0064. Web: www.airtight-anm.com.